

Artículo de investigación

The effect of aerobic exercises on the biochemical factors and hepatic enzymes of the drug in addicts of the Shefa Clinic of the city of Dehdasht

Efecto del ejercicio aeróbico que influye en los factores bioquímicos y las enzimas hepáticas sobre la droga en adictos de la Clínica Shefa de la ciudad de Dehdasht

O efeito de exercícios aeróbicos sobre os fatores bioquímicos e enzimas hepáticas da droga em dependentes químicos da Clínica Shefa da cidade de Dehdasht

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Abstract

Addiction to drugs has been the most important threatening factor got human which withdraw an individual from the society and makes various problems of the society. This research was conducted with aim of studying the effect of eight-week aerobic exercise on biochemical factors and liver enzymes of drug leaving addicts who referred to Shefa clinic in Dehdasht city. This research was empirical and 56 addicts were divided into two 28-member test and control groups. The aerobic exercises were conducted over a two-month period. SPSS23 software and correlational t-test were used to analyze data. Blood glucose, bilirubin, and ALP reduced significantly in $P < 0.01$, cholesterol, bilirubin, and AST reduced significantly in $p < 0.05$, and BUN, keratin, triglyceride, and ALT were not significant. Aerobic exercises are effective in protecting the human health of who left drug, and exercise is one way of fighting with addiction that is effective in reducing people intention to drugs.

Keywords: Aerobic exercises, biochemical factors, liver enzymes, addict, drugs.

Resumen

La adicción a las drogas ha sido el factor de amenaza más importante que se ha hecho humano, que retira a un individuo de la sociedad y crea varios problemas de la sociedad. Esta investigación se realizó con el objetivo de estudiar el efecto del ejercicio aeróbico de ocho semanas sobre los factores bioquímicos y las enzimas hepáticas de los adictos a la droga que se referían a la clínica Shefa en la ciudad de Dehdasht. Esta investigación fue empírica y 56 adictos se dividieron en dos grupos de prueba y control de 28 miembros. Los ejercicios aeróbicos se realizaron durante un período de dos meses. Se utilizaron el software SPSS23 y la prueba t correlacional para analizar los datos. La glucosa en sangre, la bilirrubina y la ALP se redujeron significativamente en $P < 0.01$, el colesterol, la bilirrubina y la AST se redujeron significativamente en $p < 0.05$, y el BUN, la queratina, los triglicéridos y la ALT no fueron significativos. Los ejercicios aeróbicos son efectivos para proteger la salud humana de quienes dejaron el medicamento, y el ejercicio es una forma de luchar contra la adicción que es eficaz para reducir la intención de las personas de consumir drogas.

Palabras claves: Ejercicios aeróbicos, factores bioquímicos, enzimas hepáticas, adictos, drogas.

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Resumo

O vício em drogas tem sido o fator ameaçador mais importante da humanidade, que retira um indivíduo da sociedade e faz vários problemas da sociedade. Esta pesquisa foi conduzida com o objetivo de estudar o efeito do exercício aeróbico de oito semanas sobre fatores bioquímicos e enzimas hepáticas de dependentes químicos que se referiam à clínica Shefa na cidade de Dehdasht. Esta pesquisa foi empírica e 56 viciados foram divididos em dois grupos de teste e controle de 28 membros. Os exercícios aeróbicos foram realizados durante um período de dois meses. O software SPSS23 e o teste t correlacional foram utilizados para analisar os dados. A glicose sanguínea, a bilirrubina e a ALP reduziram significativamente em $P < 0,01$, o colesterol, a bikirrubina e a AST reduziram significativamente em $p < 0,05$ e o BUN, a queratina, o triglicerídeo e a ALT não foram significativos. Os exercícios aeróbicos são eficazes para proteger a saúde humana de quem deixou drogas, e o exercício é uma maneira de lutar com o vício que é eficaz na redução da intenção das pessoas em relação às drogas.

Palavras-chave: Exercícios aeróbicos, fatores bioquímicos, enzimas hepáticas, dependência, drogas.

Introduction

Addiction phenomenon is not specific for Iran but it is the big contemporary problems as all countries of the world are tied to it in a way. Attachment to the drug is an important health threat and a big mental and social problem and is influenced by genetic, mental, physical, and social factors (Azizi, 2003; Moradi, 2012; Nakha'ei, 2009). One preventive way from people attachment to drugs is promoting healthy recreations and participation in sports which are significantly effective in making a healthy life, health promotion, and people hygiene (Moghaddas, 2009). Participation in sports while leisure time can have a preventive and controlling role on these people in treatment and prevention them turning back from drugs. Generally, sports and playing make happiness and attachment to the sport by activating various body systems and secreting endorphin and serotonin hormones. Consequently, sport prevents the person intending to drugs (Khurjahani, 2006). Generally, addiction treatment is a prolonged, sophisticated, and difficult procedure with frequent relapse (reuse drugs after leaving). Therefore, doing exercise and physical activities is the facilitating factor to control and leave addiction among addicts today (Poorasl et al, 2007).

According to research, another vital involved organs in various sports activities is liver whose enzymes in the blood may increase by sports activities (Cavas and Tarhan, 2004). Actually, increasing serum ALT and AST shows muscular and liver enzymes entrance to blood circulation. Therefore, changing the concentration of these enzymes can be for muscular damages (Abedi, 2004). Intensive resistance-endurance exercise

and activities most probably damage cell membrane and enzymes are released inside blood circulation by this damage. According to the findings of Bashiri et al. type, duration, and intensity of sports activities can influence these enzymes. Long-term and resistance-endurance activities of whose energy is mostly produced by aerobic activities influence on ALT-AST enzyme activities because more energy is needed through the aerobic system to produce energy to continue these exercises (Bashiri et al, 2009). ALT-AST enzymes are the involved one in liver metabolism because of liver more involved in these activities than other types. Therefore, the probability of liver cells membrane damages in resistance-endurance exercise and long-term activities is high (Rahnama and Nouri, 2009; Rawson and Persky, 2007).

Moreover, increased blood levels of cholesterol and triglyceride are one of the most popular problems that each doctor daily faces with it (Wirztum and Steinberg, 2000). Sectional studies have shown that physical activities reduce the fact levels inside the livers (Hallsworth et al, 2012). Moghadasi et al. studied the effect of 12-week physical activities modification on cholesterol- serum oxidized LDL in fat men. In this research, 16 middle-age healthy men were divided (with the mean and standard deviation of 46.06 ± 6.01) to two control (8 numbers) and test (8 number) groups. Findings showed that body weight, body mass index, fat index, fat percentage, and LDL-cholesterol after 12-week exercises showed the significant increase than the control group ($P < 0.05$) (Hosseini and Hejazi, 2013). In a conducted semi-empirical test in 2012, 16 out of all diabetics referrers to Kermanshah diabetes association participated

voluntarily in this research who were divided randomly in two aerobic (8 number) and control (8 number) groups. Exercises plan of the aerobic group included 3 running sessions in a week with maximum 60-80% of heart rate for 8 weeks. After 8 weeks of aerobic exercise, A1c hemoglobin, LDL-cholesterol, and glucose triglyceride of fasting blood significantly reduced in the aerobic group and didn't have a significant change in the control group (de Piano et al, 2007).

De Piano et al. reported that cholemic limitation and regular aerobic exercises for 30 minutes is the percentage or most of the initial weight by the resistance-endurance exercise for 3 months to improve ALT and cholesterol levels in the suffering patients from fatty liver (Booth, 2008). In addition, Booth in a research under the title of "investigation of the sports exercises effect on preventing fatty liver diseases" showed that 16-week exercise of voluntary running exercise with 50-75% of maximum oxygen consumption on the treadmill can cure non-alcoholic fatty liver in mice (Moghaddasi et al, 2011). In research of Davoudi et al., the effect of 8-week resistance-endurance exercise was studied on parenchyma of liver and liver enzymes in the suffering male to fatty liver. In this research, the selected parenchyma levels of the liver partial surface after 8-week aerobic exercising plan showed a significant reduction in the test than the control group ($P < 0.001$). Aspartate aminotransferase and alanine aminotransferase in the serum of patients showed the significant reduction in the test than the control group ($P < 0.05$) (Yousefipour et al, 2014). Barani in a research under the title of the effect of resistance-endurance exercise on serum levels of liver enzymes and physical fitness indices of women with non-alcoholic fatty liver showed that ALP value only reduced in resistance group significantly ($P < 0.03$), but ALT and AST didn't significantly change (Barani et al, 2017). ALT/AST ratio in the resistance-endurance group after exercise than before it significant increased ($P = 0.04$). However, it didn't have a significant change in the combined group (including resistance-endurance and aerobic exercises) and control group. The general objective of this research is studying the effect of 8-week aerobic exercises on biochemical factors and liver enzymes of drug leaving addicts.

Methodology

This research is empirical. People were selected by convenience sampling method. It was tried to select the ones in similar age range and have the maximum statistical population. The statistical population of this research was all drug leaving addicts who referred to Shefa addiction clinic of Dehdasht who were under leaving tramadol period for 3-month. Therefore, 56 out of 120 of addicts in 20-35 years old age were selected divided in two control and test group (each one with 28 number). To consider moral disciplines for selection, people were announced verbally about this work, participate in exercise plans, and filled the form with individual intention. Test group members did aerobic exercises for 8 weeks and five sessions a week. Aerobic exercises were passed 45 min in each session including 10 min of warming, 30 min of running with 50-70% consumed oxygen, and 5 min of cooling (Davoudi et al, 2012). SPSS23 software and correlation t-test were used to analyze data.

Results

- Results of exercise effect on biochemical factors of the drug leaving addicts: Results of this research about blood glucose showed that the mean blood sugar in test group significantly reduced than the control group in $p < 0.01$ as changed from 12.7 ± 100.4 mg. dl-l in control group to 10.1 ± 86.6 mg. dl-l in test group after exercises. Results of this research about BUN showed that the mean in test group didn't significantly changed than control group in $P < 0.05$ level; as though, it changed from 3.8 ± 15.2 mg. dl-l in control group to 3.1 ± 13.5 mg. dl-l in test group after sports. Results of this research about Keratin showed that the mean keratin in test group didn't significant changed than control group in $P < 0.05$ as it changed from 0.23 ± 1.1 mg. dl-l in control group to 0.27 ± 1.14 mg. dl-l in test group after sports. Results of this research about triglyceride showed that the mean triglyceride in test group didn't significant changed than control group in $P < 0.05$ as it changed from 10.3 ± 114.1 mg. dl-l in control group to 8.7 ± 99.9 mg. dl-l in test group after sports that was not significant. Results of this research about blood cholesterol showed that the mean blood cholesterol in test group had significantly changed than control group in $P < 0.05$ as it changed from 15.1 ± 165.6 mg. dl-l in control group to 10.6 ± 140.2 mg. dl-l in test group after sports. Results of this research about bikirubin showed that the mean bikirubin in test

group had significantly changed than control group in $P < 0.05$ as it changed from 0.11 ± 0.91 mg. dl-l in control group to 0.73 mg. dl-l in test group after sports. Results of this research about bilirubin showed that the mean bilirubin in the

test group had significantly changed than the control group in $P < 0.05$ as it changed from 0.04 ± 0.19 mg. dl-l in control group to 0.02 ± 0.14 mg. dl-l in test group after sports (table 1).

Table 1. biochemical factors of the drug leaving addicts (mg. dl-l)

Variable name		pre-test	post-test
Blood glucose (mg. dl-l)	control group	102.3 ± 15.4	100.4 ± 12.7
	test group	100.5 ± 11.2	$86.6 \pm 10.1^{**\text{¥}}$
BUN (mg. dl-l)	control group	14.6 ± 3.2	15.2 ± 3.8
	test group	13.2 ± 4.1	13.5 ± 3.1
keratin (mg. dl-l)	control group	1.08 ± 0.41	1.1 ± 0.23
	test group	1.05 ± 0.32	1.14 ± 0.27
Triglyceride (mg. dl-l)	control group	110.6 ± 12.3	114.1 ± 10.3
	test group	101.3 ± 9.21	99.9 ± 8.7
Cholesterol (mg. dl-l)	control group	165.6 ± 15.1	161.5 ± 17.2
	test group	162.3 ± 14.8	$140.2 \pm 10.6^*$
Bikirubin (mg. dl-l)	control group	0.94 ± 0.17	0.91 ± 0.11
	test group	0.97 ± 0.15	$0.73 \pm 0.12^*$
Bilirubin (mg. dl-l)	control group	0.23 ± 0.05	0.19 ± 0.04
	test group	0.22 ± 0.03	$0.14 \pm 0.02^{**}$

* Significant than control group in post-test in $P < 0.05$ level

¥ Significant than empirical group in pre-test in $P < 0.05$ level

** Significant than control group in post-test in $P < 0.01$ level

- Results of sport effect on liver enzymes of drug leaving addicts: Results of this research about AST showed that mean value of this enzyme in test group significantly changed than the control group in $P < 0.05$ as it changed from 19.57 u.l-l in control group to 15.3 u.l-l in test group after sports. Results of this research about ALT showed that mean value of this enzyme didn't significantly change than the control group

in $P < 0.05$ as it changed from 25.5 u.l-l in the control group to 26.71 u.l-l in test group after exercises which were not significant. Results of this research about ALP showed that mean of this enzyme in the test group had significant change than the control group in $P < 0.01$ as it changed from 203.46 u.l-l in control group to 143.98 u.l-l in test group after exercises (table 3).

Table 3. liver enzyme of AST, ALT, and ALP of the drug leaving addicts (u.l-l)

Variable name		pre-test	post-test
AST	control group	19.21±3.2	19.57±4.4
	test group	19.51±2.8	15.3±3.6*
ALT	control group	24.4±4.1	25.5±3.8
	test group	25.3±4.2	26.71±3.9
ALP	control group	204.5±14.8	203.46±11.78
	test group	201.6±13.5	143.98±12.56**

 * Significant than test group in pre-test in $P < 0.05$

 ** Significant than test group in pre-test in $P < 0.01$

Discussion

In this research, the effect of biochemical factors of drug leaving addicts was studied. According to the results of this research, the mean blood sugar in test group significantly reduced than the control group. Results of Ghasemnian research after one resistance-endurance exercise period on youth with overweight showed that indexes of insulin resistance and triglyceride concentration significantly reduced (Ghasemnian et al, 2013). Results of Asarzadeh showed that the combined exercises in inactive men significantly reduce insulin concentration and resistance to insulin index which is in agreement with the obtained results in this research (Asarzadeh and Abedi, 2012). In this regard, it can be claimed that the extra far accumulation from two main separate paths resists against insulin which includes the transformation of insulin signaling with cytokines secreted from adipose tissue and the damage or death of beta cells of the pancreas due to the accumulation of free fatty acids. However, long-time exercises probably improve sensitivity to insulin by changing the amount of some adipicins and reducing the accumulation of fatty acids by reducing fat accumulation and prevent resistance to insulin. Some researchers know the improvement mechanism of insulin effect as the positive adjustment of insulin receptor components, protein kinase B as well as glucose transducer protein (4GLUT-) (Kim et al, 2017).

Results of this research about BUN and keratin showed that the mean in test group didn't significantly change than control group in $P < 0.05$ which disagree with the results of some studies (Dustdar et al, 1986; Galkina and Ley, 2006), but agree with results of other studies in which they didn't show any change in urea and creatinine biochemical factors levels (Lin et al, 2006; Clarkson et al, 2006) and fully disagree with results of Kiyeh and changakeh research in which biochemical levels of these factors had increased (Keah and Chng, 2009).

Results of this research about triglyceride showed that the mean triglyceride in test group didn't significantly change than the control group in $P < 0.05$ level. Results of this research about blood cholesterol showed that mean blood cholesterol in test group significantly changed than the control group in $P < 0.05$. In Adzalphour research after a period of medium and intensive aerobic exercises in healthy men, indexes of LDL-C, TC, TGT, and HDL-C were measured in pre-middle- and post-test and had significant difference which is in agreement with the results of this research. This indicates the positive effects of aerobic exercise on improving lipid profile (Adzalphour et al, 2003). Laxonen et al. (2000) research studied lipid profile after aerobic exercises in diabetic men. C-LDL reduction and C-HDL increase in aerobic group and blood fat improvement in the exercised group confirm the results of this research (Laaksonen et al, 2000).

Results of this research about AST showed that this enzyme in test group had significant difference than control group in $P < 0.05$, but results of this research about ALT showed that the mean enzyme in test group didn't significantly change than the control group in $P < 0.05$ which is in agreement with results of Hosseini, Moghaddasi, and De Piano. The important effects of physical exercise on the liver are its effect on liver enzymes. According to studies, one vital organ involved with various physical exercise is liver whose enzymes in the blood may be increased by sports (Cavas and Tarhan, 2004). Actually, increasing serum ALT and AST show muscular and liver enzymes entrance to blood circulation. Therefore, concentration change of these enzymes can be for the muscular damages (Abedi, 2004). The intensive resistance-endurance exercises highly probably damage the cell membrane by which enzymes are released inside blood pressure. Based on Bashiri et al. findings, type, duration, and intensity of sports exercises can influence the activity of these enzymes. Long-term and resistant activities whose energy production is more than aerobic exercise influence on ALT-AST enzymes because continuity of these activities needs more energy production by the aerobic system (Bashiri, 2009). ALT-AST enzymes are the involved one in liver mechanism because the liver is more involved with these activities than the other ones. Thus, the probability of liver cells membrane damage is high in resistance-endurance activities (Rahnama and Nouri, 2009; Rawson and Persky, 2007).

Conclusion

Generally, results of this research confirm the resistance index to insulin, blood fats reduction by physical activities in addicts. However, it is suggested based on other effective factors like exercise duration and intensity, nutrition, they're their readiness level to conduct more studies in this field. The limitation of this research is absence of necessary follow-up to indicate whether the effect of intervene is long-term or not.

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